Nulling Coronagraph for Terrestrial Planet Finder

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We propose an alternative design to meet the challenge of the visible light coronagraph for the TPF mission. The core element of the design is a Fabry-Perot filter. The concept of this design is to take advantage of the Fabre-Perot's sensitive angular selectivity of a narrow transmitted light and wide reflective light (by adjusting the Fabry-Perot's finesse). By using the reflected beam from the Fabry-Perot, nulling in a very narrow field of view (where the bright star is located) is achieved. A collimated beam is dispersed by a grating and then reflected off-axis by a Fabry-Perot etalon so that the reflected nulls coincide over a range of wavelengths. Based on a study for a previous TPF mission proposal and our own experience with solar coronagraphs, we believe this design will have a high rejection ratio of stars, meanwhile providing a wide overall FOV in a broad wavelength range.